AMENDMENTS TO THE SPECIFICATION:

Please replace paragraphs [0029], [0030], [0036], [0037], [0044], and [0050] with the following amended paragraphs:

[0029] The methodology described above has been demonstrated in laboratory and field test in a briefcase size prototype ~~as shown in FIGS. 12 and 13~~. The components (filters, manifolds, circuit boards) displayed in the prototype are much larger than necessary and can be miniaturized so the size and power consumption is suitable for a battery powered personal monitor. Laboratory test results are shown in FIG. [[14]] 12 for H.sub.2S levels of 0, 6, 12, and 24 PPB generated in a chamber in the laboratory. Note the changes in concentration in the chamber were associated with the transition periods shown in the figure and do not reflect the response time of the monitor. Data from ten days of field-tests where the prototype was collocated with an ambient monitor at an Alberta Environmental Protection station is shown in FIG. [[15]] 13. The field and laboratory test data shows good agreement to the expected H.sub.2S, concentrations in the low ppb range. The field test data in FIG. [[15]] 13 also shows predicted levels of the ORS present at the site.

[0030] The portable version of the monitor ~~will appear similar (but smaller) to the prototype in FIG. 12 with~~ includes three channels providing continuous measurements of H.sub.2S, ORS, and baseline levels. Size and weight can be minimized in the personal monitor by using only one channel, which would provide an intermittent measure of H2S and ORS rather than a continuous measure.

[0036] The real-time PAH and wind data was combined and plotted in FIG. [[16]] 14 which shows a surface representing the mean of the outdoor real-time PAH levels versus wind speed and direction. The figure shows an increase in the average PAH concentration at elevated wind speeds from the westerly direction indicating a point source in the direction of the coal-fired furnace. A plot of the average PAH levels versus wind direction and temperature shows increased levels when the wind is from the west at temperatures below 15.degree. C. (see FIG. [[17]] 15). This is as expected given the

coal furnace will be producing more heat and higher emission at these low temperatures. Recharting the wind speed and direction diagram using only data with temperature below 15.degree. C. in FIG. [[18]] 16 shows a dramatic increased impact of the coal furnace at colder temperatures. These figures demonstrate that a point source existed in the direction of the coal furnace and impacted the house monitored when the wind was above 10 km/hr in the direction spanning west-southwest to northwest at temperatures below 15.degree. C. The coal furnace was responsible for the increased PAH levels assuming there were no other significant point sources of products of incomplete combustion in that direction.

[0037] This demonstrates how directions of the point sources can be located with real-time concentration data and wind speed and direction data. If data were collected in many locations then the directions provided can be used to pin point the sources location by over laying the directions. With moving monitors the data will be analyzed using a quasi finite element analysis with data from finite geographic areas grouped together and compared with wind speed and direction. Point sources will appear in each finite element similar to the PAH surface in FIG. [[18]] 16. Lines struck in the direction to a point source from the centroid of several finite elements will cross at the location of the point source. Computer algorithms will be created to perform these tasks on a continuous basis and will be able to determine if new point sources emerge and provide alarms or warning of such.

[0044] The current approach to measuring overall fugitive natural gas emissions at a facility involves open path optical sensing systems. These systems use a beam of light projected over a long distance (usually along the facility boundary) to measure the air concentrations of natural gas and predict the facility fugitive emission rate (see, for example, FIG. 17). Advanced systems can also locate individual plumes. Alberta Research Council (ARC) has demonstrated the Differential Absorption Lidar (DIAL) technology which can provide two and three dimensional pictures of plumes at a facility boundary (Presentation to PTAC Air Issues Forum. November 19, 2003. http://www.ptac.org/env/dl/envf0303p11.pdf).

[0050] The technologies current stage of development is a conceptual field prototype. The fundamental concepts of the technology have been demonstrated in the field with other contaminants but have not been attempted on natural gas. The fundamental concept of locating contaminant plumes with point measures has been demonstrated in previous work identifying emissions from a coal fired furnace. The attached FIG. [[18]] <u>16</u> taken from an unpublished study by the applicant shows the average levels of point measures of PAH concentrations plotted with wind speed and direction. This figure represent five weeks of data taken from a location near a house that was burning coal for heat. The contaminant plume shows up on the figure as a spike in concentration with wind from the west (the direction source) at 20 km/h. The figure shows how sources can be located using point measurements rather than open path optical sensing systems. This same approach will be able to locate the plumes of natural gas fugitive emissions.